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PALAEOGEOGRAPHY, PALAEOCLIMATOLOGY, PALAEOECOLOGY AN INTRODUCTION[1]

A.A. MANTEN and A.E.M. NAIRN

It is a pleasure to introduce the first issue of this international scientific journal, devoted to what may summarily be called environmental geology. It is a response to the trend in geology away from the classical divisions of the science, palaeontology, petrology, etc. already well served into the marginal and interdisciplinary fields, where a knowledge of geology must be supported by a familiarity with other sciences. It conforms to the tendency, arising from the enormous expansion of scientific output, towards more specialized journals. These serve to restrict the time needed to search the growing number of periodicals and to get a greater return from the journals to which one subscribes.

The journals' title indicates the fields of environmental geology covered. All are illustrative of the way in which advances is linked not only to advances in geology and purely geological techniques but also to advance in related biological and physical sciences. Interest in a journal of this kind was evinced at the palaeoclimates conference in Newcastle upon Tyne in 1963 but market research showed that at the present state of development none of the environmental sciences singly could support a journal. Although appearing as sections in the present format, it is anticipated that the continued growth of geo-science literature may, some time in the future, lead to specialized numbers in each of the fields. Acceptance of partial subscriptions will then enable us to keep in line with the trend to increasing specialization.

Since so many fields contribute to the advancement of palaeogeography, palaeoclimatology and palaeoecology, the great importance of this new journal consists in bringing together under a single cover results of interest to research workers in many different disciplines. In cutting across the traditional boundaries of established sciences, it will establish a forum where to the problems of general interest can be brought data from geography, geology, palaeontology, palaeobotany, pedology, palynology, geophysics, geochemistry and meteorology. To ensure a continuing high standard of papers it is encouraging to note the many outstanding workers who have agreed to serve as members of the Editorial Board. In addition to research papers it is hoped, from time to time, to publish up-to-date review articles and bibliographies of various aspects of any of these environmental sciences. Articles will be open to discussion in a section where also short research notes can receive rapid publication. Book reviews will also appear.

To avoid misunderstanding, comment on the interpretation of the term "palaeo" as used in this journal serves a useful purpose[2]. "Palaeo" means different things to different people (different degrees of ancientness, different time scales) and different disciplines. To geologists the entire Holocene, if not the entire Quaternary, is "recent". To meteorologists, and also to workers in some quite independent disciplines, the Medieval period is already "palaeo", since over most of the area of the earth's surface it is literally prehistoric, i.e., before the beginning of documentary accounts of its climate or anything else. In this respect it might be recalled that the first practical exercise arranged by the United States National Research Council's Sub-Committee on Palaeoclimatology was the Aspen, Colorado, Conference in June 1962 on the climate of the 11th to 16th centuries A.D.

If the evidence of past climates turned up by field work in a multiplicity of disciplines is ever to be interpreted as a consistent story, produced by known or

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[1] Reprinted from vol. 1(1) of Palaeogeography, -climatology, -ecology.

[2] The authors wish to acknowledge much useful discussion with Mr. H.H. Lamb on this subject. What has been said, using meteorology as an example, is equally relevant to other environmental studies.

intelligible physical processes, it is certain that the interpretation will have to be provided by meteorology. It is no less certain that meteorology must proceed by studying those climatic variants for which the fullest information exists. This means learning all that is possible of the genesis and behaviour of the great range of climates of the last centuries and millenia. Appropriate methods must also include study of present-day climate and to what disturbing agencies it is sensitive, also of mathematical models.

Therefore, it is our opinion that this journal should embrace palaeogeography, palaeoclimatology and palaeoecology in the broadest sense, and cover methods, techniques and results relevant to this end.

The environmental geo-sciences are a fertile field for speculation and have provided an intellectual stimulus even from early times. Climate and geography are both important factoes in human affairs from the days of the primitive hunters and hopes, fears and speculations are found embodied in the traditions of floods, "golden ages" and lost continents of many different races. Passing reference to ancient climate or geography is to be found in the writings of many classical scholars, Strabo, Pythagoras, Aristotle and others. Leonardo da Vinci and other Renaissance scholars made similar references.

Until the 19th century, however, the magnitude of the conclusions drawn and theories propounded bore little relation to the weight of available observation. It was the achievement of the late 18th early 19th century to establish science as a discipline in which data gathering supplanted speculation and in which inference depended upon observation. Then Knoor and Walet distinguished between palagic and shallow water marine fossils, and J.V. Audouin, E. Milne Edwards and E. Forbes showed how results of marine ecology could be applied to geology, thus founding palaeoecology. James Hutton's *Theory of the Earth* made palaeogeography possible. It is a salutory experience to read in even the early editions of Sir Charles Lyell's *Principles of Geology* his discussion of ancient climates and to realise that its modernity is that its ideas lie unchanging at the roots of modern geology. The wealth of observation of over a hundred years has not fundamentally altered the framework of the science.

However, it seems that at the present time the accent is changing from a static to a dynamic picture of events largely under the stimulus of advances in branches of geophysics such as meteorology and oceanography.

Problems, such as an expanding or contracting earth, continental drift and/or polar wandering, have thrown the environmental geosciences into a state of flux, out of which, one hopes, will emerge a clearer understanding of the behaviour of the earth. *Palaeoclimatology, Palaeogeography, Palaeoecology* is established in the belief that it can play an important role in this development by being a source of information and a forum for the exchange of views in its chosen fields.

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